

70. (New) The receiver section of claim 69, wherein the pressure sensor mounts and the spacers are made of steel.
71. (New) The receiver section of claim 69, further comprising compliant pads between the pressure sensor mounts and the spacers.
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REMARKS

Applicants note that references cited in the parent case disclose pressure sensors aligned with their axis of polarization radial to the axis of the tool. U.S. Patent No. 5,343,001 teaches transducers poled radially outward or inward in column 14, lines 43 through 51. U.S. Patent No. 5,043,952 teaches hydrophones aligned with their axis of polarization perpendicular to the axis of the tool as shown in Figs. 12 and 13 and described in column 13, lines 8 through 34. Neither reference suggests a tool or receiver section wherein the axis of polarization of the pressure sensors is parallel to the axis of the tool body.

There were 67 claims including 10 independent claims in the application as filed. Eighteen claims including three independent claims were canceled without prejudice. Four new claims including one independent claim were added. It is believed that no fee is due in association with this preliminary amendment. If a fee is due, the Commissioner is hereby authorized to charge any fee or credit any overpayment to Deposit Account No. 50-1122.

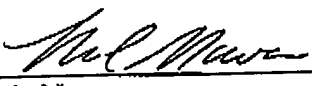
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Schlumberger K.K.
2-2-1 Fuchinobe
Sagamihara-shi, Kanagawa-ken
229-0006 Japan

Respectfully submitted,

By 
Robin Nava
Registration No. 42,926

81-42-759-5202
81-42-759-5398 (fax)
Rnava@slb.com

VERSION WITH CHANGES MARKED

1. (Amended) A sleeve for the receiver section for an acoustic logging tool including a tool body with receiver stations; the sleeve being capable of surrounding the tool body at least in the region of the receiver stations and having [alternating] first and second apertured portions spaced along its length, the first apertured portion having elongate axial bar elements separated by windows in a circumferential arrangement, the windows being wider than the bars, and the second apertured portion having rows of circumferentially elongate slots; characterised in that each slot has a [centre] center portion and end portions, the [centre] center portion being narrower than the end portions, and the end portions being enlarged compared to the [centre] center portion, wherein the dimensions in the first apertured portion are chosen to provide a low spring constant to the sleeve.
3. (Amended) A sleeve as claimed in claim 2, wherein the ratio[n] of the width of the slot in the center [center] portion to the radius of the end portion is at least 1:4.
5. (Amended) A sleeve as claimed in claim 1, 2 or 3 wherein [each] a second apertured portion [has three rows of slots] is provided at each end of the sleeve.
6. (Amended) A sleeve as claimed in any of claims 1 to 5, wherein each first apertured portion has no more than eight windows.
7. (Amended) A sleeve as claimed in any of claims 1 to 6, wherein a first apertured portion surrounds the receiver stations [the first apertured portion has windows of two alternating widths].
8. (Amended) A sleeve as claimed in claim 7, wherein the windows of a first apertured portion are located in front of the receiver stations [have widths of 25° and 45° respectively].

10. (Amended) An acoustic logging tool comprising a tool body with a transmitter section and a receiver section comprising a number of receiver stations spaced along a tool body, each station comprising at least one receiver [including a number of polarised pressure sensors spaced around the circumference of the tool body.] and a sleeve surrounding the tool body at least in the region of the receiver stations and having [alternating] first and second apertured portions spaced along its length, the first apertured portion having elongate axial bar elements separated by windows in a circumferential arrangement; the windows being wider than the bars, and the second apertured portion having rows of circumferentially elongate slots, characterised in that the sleeve comprises a sleeve as claimed in any of claims 1 to 9_ [and the axis of polarisation of the sensors is parallel to the axis of the tool body.]
11. (Amended) A tool as claimed in claim 10, wherein the slots in each row of the second apertured portion are offset from adjacent rows. [pressure sensors comprise piezoelectric stacks.]
12. (Amended) A tool as claimed in claim 10 or 11, wherein each station is surrounded by a first apertured portion of the sleeve. [has four pressure sensors spaced equidistantly around the tool body.]
13. (Amended) A tool as claimed in claim 10, 11 or 12, comprising a central mandrel around which are mounted alternate [, pressure sensor] receiver mounts and spacers, the spacers being firmly connected to the mandrel and the [sensor] receiver mounts being held in position by the spacers.
14. (Amended) A tool as claimed in claim 13 wherein the spacers and [pressure sensor] receiver mounts are made of steel.

15. (Amended) A tool as claimed in claim 13 or 14, wherein each [pressure sensor] receiver mount contacts its neighboring [neighbouring] spacers via resilient contact pads.
16. (Amended) A tool as claimed in any of claims 13, 14 or 15, wherein, when arranged vertically, the weight of each [pressure sensor] receiver mount is carried by the spacer located below that mount.
17. (Amended) A receiver section for an acoustic logging tool comprising a number of receiver stations spaced along a tool body, each station including a number of polarized [polarised] pressure sensors wherein [spaced around the circumference of the tool body, characterised in that] the axis of polarization [polarisation] of the sensors is parallel to the axis of the tool body.
25. (Amended) A receiver section as claimed in any of claims 17 to 24, further comprising a sleeve being capable of surrounding the tool body at least in the region of the receiver stations and having [alternating] first apertured portion and second apertured portion spaced along its length, wherein
 - (a) the first apertured portion has elongate axial bar elements separated by windows in a circumferential arrangement, the windows being wider than the bars, and
 - (b) the second apertured portion has rows of circumferentially elongate slots, each slot having a [centre] center portion and end portions, the [centre] center portion being narrower than the end portions, and the end portions being enlarged compared to the [centre] center portion.
26. (Amended) A receiver section as claimed in claim 25, wherein the slots of the second apertured portion have parallel sides in the [centre] center portion and approximately circular end portions.

27. (Amended) A receiver section as claimed in claim 26, wherein the dimensions of the windows in the first apertured portion are chosen to give a low spring constant to the sleeve [ration of the width of the slot in the centre portion to the radius of the end portion is at least 1:4].
28. (Amended) A receiver section as claimed in claim 27, wherein first apertured portions and second aperture portions alternate along the length of the sleeve [the ratio is about 1:6].
29. (Amended) A receiver section as claimed in claim 25, 26 or 27 wherein each second apertured portion is provided at each end of the sleeve [has three rows of slots].
30. (Amended) A receiver section as claimed in any of claims 25 to 29, wherein each first apertured portion has no more than eight windows.
31. (Amended) A receiver section as claimed in any of claims 25 to 30, wherein a first apertured portion surrounds the receiver stations. [the first apertured portion has windows of two alternating widths.]
32. (Amended) A receiver section as claimed in claim 31, wherein the windows of a first apertured portion are located in front of receiver stations. [have widths of 25° and 45° respectively.]
51. (Amended) An acoustic logging tool comprising a tool body with a transmitter section and a receiver section, said receiver section comprising a number of receiver stations spaced along a tool body, each station including a number of polarized pressure sensors [spaced around the circumference of the tool body, wherein said pressure sensors comprise] comprising piezoelectric stacks, [and each station comprises a plurality of pressure sensors spaced around the tool

body] characterized in that the axis of polarization of the sensors is parallel to the axis of the tool body.

52. (Amended) An acoustic logging tool comprising a tool body with a transmitter section comprising a dipole transmitter and a receiver section [for an acoustic logging tool] comprising a number of receiver stations spaced along a tool body, each station including a number of polarized pressure sensors spaced around the circumference of the tool body, characterized in that the axis of polarization of the sensors is parallel to the axis of the tool body.
53. (Amended) The acoustic logging tool of claim 52, wherein the pressure sensors comprise ceramic piezoelectric stacks.
54. (Amended) The [receiver section] acoustic logging tool of claim 52, wherein each said station comprises four pressure sensors spaced equidistantly around the tool body.
55. The [receiver section] acoustic logging tool of claim 52, wherein the receiver section further comprises[ing] a central mandrel around which are mounted alternate, pressure sensor mounts and spacers, the spacers being firmly connected to the mandrel and the sensor mounts being held in position by the spacers.
56. (Amended) The [receiver section] acoustic logging tool of claim 55 wherein [the] said spacers and said pressure sensor mounts are made of steel.
57. (Amended) The [receiver section] acoustic logging tool of claim 55 wherein each pressure sensor mount contacts its neighboring spacers via resilient contact pads.
58. (Amended) The [receiver section] acoustic logging tool of claim 55, wherein, the central mandrel comprises a rod having a sheath. [when arranged vertically, the

weight of each pressure sensor mount is carried by the spacer located below that mount.]

59. (Amended) The [receiver section] acoustic logging tool of claim 52, wherein said receiver section forms a part of an acoustic logging tool comprising a sonde body and a transmitter section.
68. (New) A receiver section for an acoustic logging tool comprising a number of receiver stations spaced along a tool body, each station including a number of polarized pressure sensors spaced around the circumference of the tool body, characterized in that the axis of polarization of the sensors is parallel to the axis of the tool body, said pressure sensors in pressure sensor mounts disposed about a central mandrel, wherein said pressure mounts are moveable along the mandrel.
69. (New) The receiver section of claim 68, further comprising spacers between the pressure sensor mounts, wherein spacers are firmly connected to said central mandrel.
70. (New) The receiver section of claim 69, wherein the pressure sensor mounts and the spacers are made of steel.
71. (New) The receiver section of claim 69, further comprising compliant pads between the pressure sensor mounts and the spacers.

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